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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
WONG, ALLEN C	

ART UNIT	PAPER NUMBER
2613	

DATE MAILED: 12/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/672,352	STALEY ET AL.	
	Examiner	**Art Unit**	
	Allen Wong	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 October 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-6,8-19,21 and 23-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-6,8-19,21 and 23-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 10/3/05 have been fully considered but they are not persuasive.

Regarding the 35 U.S.C. 101 rejection, it is currently withdrawn since the applicant has properly amended claim 19.

Regarding lines 2-3 on page 10 and lines 10-11 on page 11 of applicant's remarks, applicant asserts that neither Lim, Linzer nor Gonzales teach, disclose or suggest a separate function, for each frame in a sequence of frames, that relates encoded size to encoded quality for each frame. The examiner respectfully disagrees. In fig.1, Lim discloses the controller 10 is connected to the buffer 120 that receives various amounts or sizes of image frames encoded by coder 110, in that a sequence of frames is sent through the encoding system of fig.1 in a recyclical or recursive manner that applies an MPEG video image encoding recursive rate control encoding scheme for encoding a plurality of images, I, P and B frames. Each frame within that sequence of frames (GOP) have different sizes. Further, Lim's fig.1, there is a quantization controller 10 and a selector 160 that decides which quantization parameter to use on the evaluated frame(s) in order to properly allocate the number of bits to the evaluated frame(s) for efficient coding. Thus, Lim teaches a separate function, for each frame in a sequence of frames, that relates encoded size to encoded quality for each frame.

Regarding lines 4-7 on page 10 and lines 11-14 on page 11 of applicant's remarks, applicant contends that neither Lim, Linzer nor Gonzales teach, disclose or

suggest a search of all of the separate functions to determine a best quality value to encode the entire sequence, and encoding each frame using the same determined best quality for all of the frames. The examiner respectfully disagrees. In fig.1, Lim discloses an MPEG video image encoding recursive rate control encoding scheme, as elaborated in the above arguments. Note the buffer 110 is image data storage that can store images of various sizes in that a recursive process is done to monitor the quality of the encoded bit frames by checking on the buffer fullness to determine the total size constraint. The Qp adjuster 130 of Lim's fig.1 adjusts the quality of the encoded frames and element 160 selects the best quality value Qp out of a plurality of quality values obtained by functions performed by Qp adjuster and evaluation of the multitudes of degrees of buffer fullness. Thus, best quality value is ascertained and searched, as disclosed in col.3, ln.47-53. Therefore, Lim discloses a search of all of the separate functions to determine a best quality value to encode the entire sequence, and encoding each frame using the same determined best quality for all of the frames.

Linzer is used to teach *prior to encoding* any of the frames that performs a search of all frames in the sequence of frames for a best quality value, as disclosed in Linzer's fig.3, element 24. Also, see col.5, ln.63-67, col.6, ln.9-13 and ln.25-26, where the statistics gatherer 24 obtains a search of all the frames from the video sources to obtain a best quality value prior to encoding any of the frames. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Lim and Linzer, together as a whole, for gathering all of the possible pre-encoding data so as to

efficiently encoding high quality images in an accurate, precise manner, as suggested in Linzer's column 3, line 64 to column 4, line 13.

Regarding lines 2-4 on page 12 of applicant's remarks, applicant states that there is no motivation in Linzer to combine with Lim. The examiner respectfully disagrees. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, it would have been obvious to one of ordinary skill in the art to combine the teachings of Lim and Linzer, together as a whole, for gathering all of the possible pre-encoding data so as to efficiently encoding high quality images in an accurate, precise manner, as suggested in Linzer's column 3, line 64 to column 4, line 13.

Thus, claims 1, 16 and 19 are met by Lim in view of Linzer.

Dependent claims 4-6, 8-15, 17, 18, 21, and 23-31 are rejected for at least the reasons stated above and in the rejection below.

Thus, the rejection of claims 1, 4-6, 8-19, 21 and 23-31 is maintained.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 4-6, 8, 12-14, 16-19, 21, 23 and 26-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lim (5,638,126) in view of Linzer (6,038,256).

Regarding claims 1 and 19, Lim discloses a program storage media storing computer executable instructions, the instructions to cause a computer to:

determining a separate function for each frame in a sequence of frames, each function relating encoded size to encoded quality for each frame in a sequence of frames, each frame having data for an image (fig.1, element 10 is the controller connected to the buffer 120 that receives various sizes or amounts of frame image data encoded by coder 110, where a sequence of frames is sent through the encoding system of fig.1 in that since Lim's invention uses an MPEG encoder for encoding a plurality of images, I, P and B frames, each frame within that sequence of frames (GOP) have different sizes, and further, note quantization controller 10, there is a selector 160 that decides which quantization parameter to use on the evaluated frame(s) in order to properly allocate the number of bits to the evaluated frame(s) for efficient coding);

performing a search of all of the separate functions to determine a best quality value for encoding the sequence of frames whose encoded sizes satisfy one or more constraints, the constraints being associated with one or more of a transmission line bandwidth, a receiver buffer size and a total size constraint (fig.1, element 10 is the controller connected to the buffer 120 that receives various sizes or amounts of frame image data encoded by coder 110, where the process of generating the encoded data

at an acceptable bit rate for transmission in that a recursive process is done to monitor the quality of the encoded bit frames by checking on the buffer fullness to determine the total size constraint, and note Qp adjuster 130 adjusts the quality of the encoded frames and element 160 selects the best quality value Qp, thus, best quality value is ascertained; see col.3, ln.47-53);

encode each frame of the entire sequence of frames with the determined best quality value (fig.1, note Qp adjuster 130 adjusts the quality of the encoded frames and element 160 selects the best quality value Qp, and coder 110 utilizes the information from quantization parameter deciding block 10 for coding with the best quality value);

determine whether each encoded frame satisfies the constraints (fig.1, note a recursive process is done to monitor the quality of the encoded bit frames by checking on the buffer fullness to determine the total size constraint to determine whether the frame satisfies the constraints); and

if the encoded frames satisfy the constraints, order transmission of frames of the sequence (fig.1, note data from buffer 120 is transmitted to transmission for transmission of frames of the sequence of images).

Lim does not specifically disclose the prior to encoding any of the frames that performs a search of all frames in the sequence of frames for a best quality value. However, Linzer teaches that prior to encoding any of the frames, there is an execution of searching of all the frames prior to encoding any of the frames (fig.3, element 24 and col.5, ln.63-67 and col.6, ln.9-13 and ln.25-26, note the statistics gatherer 24 obtains a search of all the frames from the video sources to obtain a best quality value prior to

encoding any of the frames). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Lim and Linzer, together as a whole, for gathering all of the possible pre-encoding data so as to efficiently encoding high quality images in an accurate, precise manner (Linzer col.3, ln.64 to col.4, ln.13).

Note claims 4-6, 12-14, 21 and 26-31 have similar corresponding elements.

Regarding claims 8 and 23, Lim discloses the encoded frames are from a group of temporally encoded pictures (Lim's invention uses an MPEG encoder for encoding a sequence of images wherein the plurality of images are I, P and B frames, and that these are temporal).

Regarding claim 16, Lim discloses a system for encoding image frames, the system comprising:

a controller connected to receive data on sizes on image frames that are part of a sequence of image frames (fig.1, element 10), to be encoded by the encoder and to control quality of the encoded frames produced by the encoder based on:

determination of a separate function for each image frame in the sequence of image frames, each function relating encoding size to encoded quality for each frame in the sequence of frames (fig.1, element 10 is the controller connected to the buffer 120 that receives various sizes or amounts of frame image data encoded by coder 110, where a sequence of frames is sent through the encoding system of fig.1 in that since Lim's invention uses an MPEG encoder for encoding a plurality of images, I, P and B frames, each frame within that sequence of frames (GOP) have different sizes, and further, note quantization controller 10, there is a selector 160 that decides which

quantization parameter to use on the evaluated frame(s) in order to properly allocate the number of bits to the evaluated frame(s) for efficient coding);

a search of all of the separate functions to determine a best quality value for encoding the sequence of frames whose encoded sizes satisfy one or more constraints, the constraints being associated with one of a bandwidth of a transmission line, space in a receiver buffer and a total compressed size (fig.1, element 10 is the controller connected to the buffer 120 that receives various sizes or amounts of frame image data encoded by coder 110, where the process of generating the encoded data at an acceptable bit rate for transmission in that a recursive process is done to monitor the quality of the encoded bit frames by checking on the buffer fullness to determine the total size constraint, and note Qp adjuster 130 adjusts the quality of the encoded frames and element 160 selects the best quality value Qp, thus, best quality value is ascertained; see col.3, ln.47-53); and

a variable bit rate encoder controlled by the controller configured to encode each frame of the entire sequence of frames with the determined best quality value, wherein the controller is further configured to determine whether each encoded frame satisfies the constraints, and if the encoded frames satisfy the constraints, transmitting the sequence of encoded frames (fig., element 110 is the variable bit rate encoder controlled by the controller 10 connected to the buffer 120 that receives various sizes or amounts of frame image data encoded by coder 110, where the process of generating the encoded data at an acceptable bit rate for transmission in that a recursive process is done to monitor the quality of the encoded bit frames by checking on the buffer fullness

to determine the total size constraint, and note Qp adjuster 130 adjusts the quality of the encoded frames and element 160 selects the best quality value Qp, thus, best quality value is ascertained; see col.3, ln.47-53).

Lim does not specifically disclose the *prior to encoding* any of the frames that performs a search of all frames in the sequence of frames for a best quality value. However, Linzer teaches that prior to encoding any of the frames, there is an execution of searching of all the frames prior to encoding any of the frames (fig.3, element 24 and col.5, ln.63-67 and col.6, ln.9-13 and ln.25-26, note the statistics gatherer 24 obtains a search of all the frames from the video sources to obtain a best quality value prior to encoding any of the frames). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Lim and Linzer, together as a whole, for gathering all of the possible pre-encoding data so as to efficiently encoding high quality images in an accurate, precise manner (Linzer col.3, ln.64 to col.4, ln.13).

Regarding claim 17, Lim discloses wherein the controller is configured to determine a relation between quality of an encoded image frame and amount of encoded data from the received size data (col.3, ln.47-53 and fig.1, note Qp adjuster 130 adjusts the quality of the encoded frames and element 160 selects the best quality value Qp based on the data obtained from the buffer 120).

Regarding claim 18, Lim discloses wherein the controller is configured to determine a best quality value for encoding an image frame from size data on data frames encoded with different qualities (fig.1, element 10 is the controller connected to the buffer 120 that receives various sizes or amounts of frame image data encoded by

coder 110, where the process of generating the encoded data at an acceptable bit rate for transmission in that a recursive process is done to monitor the quality of the encoded bit frames by checking on the buffer fullness to determine the total size constraint, and note Qp adjuster 130 adjusts the quality of the encoded frames and element 160 selects the best quality value Qp; see col.3, ln.47-53).

Claims 9-11, 15 and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lim (5,638,126) Linzer (6,038,256) and in view of Gonzales (5,231,484).

Regarding claims 9-11, 15 and 24-25, Lim does not specifically disclose wherein each instruction to estimate one of the forms, further causes the computer to: compute a plurality of pairs of encoded quality and encoded size values for each frame of the sequence from encoded frame data; and determine a functional relationship between values of the encoded quality and the encoded size for the plurality of frames from the pairs of values. However, Gonzales teaches the calculation of the pairs of quantization parameters for each frame with their respective encoded size values (col.21, ln.3-33; note the QP_{low} has two different values calculated for the different values of the picture, where delta u is the upper limit and delta l is the lower limit for the allocation of bits for the picture or frame, and note that there is a function relationship between the values of the encoded quality and the encoded size of the frames as shown by formula for QP_{low}). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Lim and Gonzales, as a whole, for providing optimal visual quality when

encoding picture or frame data in an accurate, efficient manner (Gonzales col.8, ln.29-38).

Conclusion

3. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen Wong whose telephone number is (571) 272-7341. The examiner can normally be reached on Mondays to Thursdays from 8am-6pm Flextime.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Allen Wong
Primary Examiner
Art Unit 2613

AW
12/5/05